WHAT IS CLAIMED:

1. An isolated nucleic acid selected from the group consisting of:

(i) a genomic DNA sequence consisting essentially of a nucleic acid sequence coding for a T1R mammalian G protein-coupled receptor polypeptide active in taste signaling, wherein said nucleic acid sequence consists essentially of a nucleic acid sequence selected from the group consisting of SEQ ID NOs 15 and 20;

(ii) a genomic DNA sequence consisting essentially of a nucleic acid sequence coding for a T1R mammalian G protein-coupled receptor polypeptide have an amino acid sequence selected from the group consisting of SEQ ID NOs 4, 14, 17, and 21;

(iii) a genomic DNA sequence having at least about 50% identity to a nucleic acid sequence coding for a T1R mammalian G protein-coupled receptor polypeptide, wherein said nucleic acid sequence consists essentially of a nucleic acid sequence selected from the group consisting of SEQ ID NOs 15 and 20; a nucleic acid sequence selected from the group consisting of SEQ ID NOs 15 and 20

(iv) a genomic DNA sequence consisting essentially of a nucleic acid sequence coding for a T1R mammalian G protein-coupled receptor polypeptide having an amino acid sequence that is at least about 40% identical to the amino acid sequence selected from the group consisting of SEQ ID NOs 4, 14, 17, and 21;

(v) a genomic DNA sequence consisting essentially of a sequence coding for a T1R mammalian G protein-coupled receptor polypeptide comprising a consensus sequence selected from the group consisting of SEQ ID NOs 18 and 19, and sequences having at least about 75% identity to SEQ ID NOs 18 or 19;

(vi) a cDNA sequence having the same nucleic acid sequence as the T1R mammalian G protein-coupled receptor polypeptide coding region in the genomic DNA sequence selected from the group consisting of SEQ ID NOs 15 and 20;

(vii) a cDNA sequence coding for a T1R mammalian G protein-coupled receptor polypeptide having an amino acid sequence selected from the group consisting of SEQ ID NOs 4, 14, 17, and 21;

(viii) a cDNA sequence coding for a T1R mammalian G protein-coupled receptor polypeptide comprising a consensus sequence selected from the group consisting of SEQ ID NOs 18 and 19, and sequences having at least about 75% identity to SEQ ID NOs 18 or 19;

(ix) a cDNA sequence selected from the group consisting of SEQ ID NOs 3, 13, 16, and 20;

(x) a cDNA sequence having at least about 50% sequence identity to the T1R G protein-coupled receptor polypeptide coding region in the genomic DNA sequence selected from the group consisting of SEQ ID NOs 15 and 20;

(xi) a cDNA sequence having at least about 50% sequence identity to a sequence encoding a T1R mammalian G protein-coupled receptor polypeptide having an amino acid sequence selected from the group consisting of SEQ ID NOs 4, 14, 17, and 21;

(xii) a cDNA sequence having at least about 50% identity to a sequence selected from the group consisting of SEQ ID NOs 3, 13, 16, and 20;

(xiii) a variant of a nucleotide sequence selected from the group consisting of SEQ ID NOs 3, 13, 15, 16, and 20, containing at least one conservative substitution in a region coding for a T1R G protein-coupled receptor polypeptide active in taste signaling;

(xiv) a variant of a nucleotide sequence encoding a T1R G protein-coupled receptor polypeptide having an amino acid sequence selected from the group consisting of SEQ ID NOs 4, 14, 17, and 21, containing at least one conservative substitution in a T1R mammalian G protein-coupled receptor polypeptide coding region; and

(xv) a variant of a cDNA sequence selected from the group consisting of SEQ ID NOs 3, 13, 16, and 20, containing at least one conservative substitution.

2. An isolated genomic DNA molecule consisting essentially of a nucleic acid sequence coding for a mammalian G protein-coupled receptor polypeptide, wherein said nucleic acid sequence consists essential of SEQ ID NO 15 or 20.

3. An isolated RNA molecule transcribed from the isolated DNA molecule of claim 2.

4. An isolated nucleic acid molecule that hybridizes to the DNA molecule of claim 2 under stringent hybridization conditions.

5. An isolated nucleic acid molecule that hybridizes to the DNA molecule of claim 2 under moderate hybridization conditions.

6. An isolated fragment of the genomic DNA molecule of claim 2 that is at least about 20 to 30 nucleotide bases in length.

7. A chimeric or fused nucleic acid molecule, wherein said chimeric or fused nucleic acid molecule comprises at least part of the coding sequence contained in the DNA molecule of claim 2, and at least part of a heterologous coding sequence, wherein transcription of said chimeric or fused nucleic acid molecule results in a single chimeric nucleic acid transcript.

8. The chimeric or fused nucleic acid molecule of claim 7, wherein said heterologous coding sequence is from a sequence encoding a different G protein-coupled receptor.

9. The chimeric or fused nucleic acid molecule of claim 7, wherein said heterologous coding sequence is a sequence that facilitates expression of said mammalian G protein-coupled receptor polypeptide on the surface of a cell.

10. The chimeric or fused nucleic acid molecule of claim 9, wherein said heterologous coding sequence is from a mammalian rhodopsin gene.

11. The chimeric or fused nucleic acid molecule of claim 7, wherein said heterologous coding sequence is from a gene encoding green fluorescent protein or other detectable marker gene.

12. An isolated genomic DNA molecule consisting essentially of a nucleic acid sequence coding for a mammalian G protein-coupled receptor having an amino acid sequence selected from the group consisting of SEQ ID NOs 4, 14, 17, and 21.

13. An isolated RNA molecule transcribed from the isolated DNA molecule of claim 12.

14. An isolated nucleic acid molecule that hybridizes to the DNA molecule of claim 12 under stringent hybridization conditions.

15. An isolated nucleic acid molecule that hybridizes to the DNA molecule of claim 12 under moderate hybridization conditions.

16. An isolated fragment of the genomic DNA molecule of claim 12 that is at least about 20 to 30 nucleotide bases in length.

17. A chimeric or fused nucleic acid molecule, wherein said chimeric or fused nucleic acid molecule comprises at least part of the coding sequence contained in the DNA molecule of claim 12, and at least part of a heterologous coding sequence, wherein transcription of said chimeric or fused nucleic acid molecule results in a single chimeric nucleic acid transcript.

18. The chimeric or fused nucleic acid molecule of claim 17, wherein said heterologous coding sequence is from a sequence encoding a different G protein-coupled receptor.

19. The chimeric or fused nucleic acid molecule of claim 17, wherein said heterologous coding sequence is a sequence that facilitates expression of said mammalian G protein-coupled receptor polypeptide on the surface of a cell.

20. The chimeric or fused nucleic acid molecule of claim 19, wherein said heterologous coding sequence is from a mammalian rhodopsin gene.

21. The chimeric or fused nucleic acid molecule of claim 17, wherein said heterologous coding sequence is from a gene encoding green fluorescent protein or other detectable marker gene.

22. An isolated genomic DNA molecule consisting essentially of a nucleic acid sequence having at least about 50% identity to a nucleic acid sequence coding for a mammalian G protein-coupled receptor polypeptide, wherein said nucleic acid sequence consists essentially of a nucleic acid sequence selected from the group consisting of SEQ ID NOs 15 and 20.

23. An isolated RNA molecule transcribed from the isolated DNA molecule of claim 22.

24. An isolated nucleic acid molecule that hybridizes to the DNA molecule of claim 22 under stringent hybridization conditions.

25. An isolated nucleic acid molecule that hybridizes to the DNA molecule of claim 22 under moderate hybridization conditions.

26. An isolated fragment of the genomic DNA molecule of claim 22 that is at least about 20 to 30 nucleotide bases in length.

27. A chimeric or fused nucleic acid molecule, wherein said chimeric or fused nucleic acid molecule comprises at least part of the coding sequence contained in the DNA molecule of claim 22, and at least part of a heterologous coding sequence, wherein transcription of said chimeric or fused nucleic acid molecule results in a single chimeric nucleic acid transcript.

28. The chimeric or fused nucleic acid molecule of claim 27, wherein said heterologous coding sequence is from a sequence encoding a different G protein-coupled receptor.

29. The chimeric or fused nucleic acid molecule of claim 27, wherein said heterologous coding sequence is a sequence that facilitates expression of said mammalian G protein-coupled receptor polypeptide on the surface of a cell.

30. The chimeric or fused nucleic acid molecule of claim 29, wherein said heterologous coding sequence is from a mammalian rhodopsin gene.

31. The chimeric or fused nucleic acid molecule of claim 27, wherein said heterologous coding sequence is from a gene encoding green fluorescent protein or other detectable marker gene.

32. An isolated genomic DNA molecule consisting essentially of a nucleic acid sequence coding for a mammalian G protein-coupled receptor having an amino acid sequence that is at least about 40% identical to the amino acid sequence selected from the group consisting of SEQ ID NO: 4, 14, 17, and 21.

33. An isolated RNA molecule transcribed from the isolated DNA molecule of claim 32.

34. An isolated nucleic acid molecule that hybridizes to the DNA molecule of claim 32 under stringent hybridization conditions.

35. An isolated nucleic acid molecule that hybridizes to the DNA molecule of claim 32 under moderate hybridization conditions.

36. An isolated fragment of the genomic DNA molecule of claim 32 that is at least about 20 to 30 nucleotide bases in length.

37. A chimeric or fused nucleic acid molecule, wherein said chimeric or fused nucleic acid molecule comprises at least part of the coding sequence contained in the DNA molecule of claim 32, and at least part of a heterologous coding sequence, wherein transcription of said chimeric or fused nucleic acid molecule results in a single chimeric nucleic acid transcript.

38. The chimeric or fused nucleic acid molecule of claim 37, wherein said heterologous coding sequence is from a sequence encoding a different G protein-coupled receptor.

39. The chimeric or fused nucleic acid molecule of claim 37, wherein said heterologous coding sequence is a sequence that facilitates expression of said mammalian G protein-coupled receptor polypeptide on the surface of a cell.

40. The chimeric or fused nucleic acid molecule of claim 39, wherein said heterologous coding sequence is from a mammalian rhodopsin gene.

41. The chimeric or fused nucleic acid molecule of claim 37, wherein said heterologous coding sequence is from a gene encoding green fluorescent protein or other detectable marker gene.

42. An isolated cDNA molecule comprising a nucleic acid sequence having the same sequence as the mammalian G protein-coupled receptor polypeptide coding region contained in a genomic DNA sequence consisting essentially of a nucleic acid sequence selected from the group consisting of SEQ ID NOs 15 and 20.

43. An isolated RNA molecule transcribed from the isolated DNA molecule of claim 42.

44. An isolated nucleic acid molecule that hybridizes to the DNA molecule of claim 42 under stringent hybridization conditions.

45. An isolated nucleic acid molecule that hybridizes to the DNA molecule of claim 42 under moderate hybridization conditions.

46. An isolated fragment of the genomic DNA molecule of claim 42 that is at least about 20 to 30 nucleotide bases in length.

47. A chimeric or fused nucleic acid molecule, wherein said chimeric or fused nucleic acid molecule comprises at least part of the coding sequence contained in the DNA molecule of claim 42, and at least part of a heterologous coding sequence, wherein transcription of said chimeric or fused nucleic acid molecule results in a single chimeric nucleic acid transcript.

48. The chimeric or fused nucleic acid molecule of claim 47, wherein said heterologous coding sequence is from a sequence encoding a different G protein-coupled receptor.

49. The chimeric or fused nucleic acid molecule of claim 47, wherein said heterologous coding sequence is a sequence that facilitates expression of said mammalian G protein-coupled receptor polypeptide on the surface of a cell.

50. The chimeric or fused nucleic acid molecule of claim 49, wherein said heterologous coding sequence is from a mammalian rhodopsin gene.

51. The chimeric or fused nucleic acid molecule of claim 47, wherein said heterologous coding sequence is from a gene encoding green fluorescent protein or other detectable marker gene.

52. A nucleic acid molecule comprising the isolated cDNA of claim 42 operably linked to a heterologous promoter that is either regulatable or constitutive.

53. The nucleic acid molecule of claim 52, wherein said regulatable promoter is inducible under specific environmental or developmental conditions.

54. An isolated cDNA molecule comprising a nucleic acid sequence coding for a G protein-coupled receptor polypeptide having an amino acid sequence selected from the group consisting of SEQ ID NOs 4, 14, 17, and 21.

55. An isolated RNA molecule transcribed from the isolated DNA molecule of claim 54.

56. An isolated nucleic acid molecule that hybridizes to the DNA molecule of claim 54 under stringent hybridization conditions.

57. An isolated nucleic acid molecule that hybridizes to the DNA molecule of claim 54 under moderate hybridization conditions.

58. An isolated fragment of the genomic DNA molecule of claim 54 that is at least about 20 to 30 nucleotide bases in length.

59. A chimeric or fused nucleic acid molecule, wherein said chimeric or fused nucleic acid molecule comprises at least part of the coding sequence contained in the DNA molecule of claim 54, and at least part of a heterologous coding sequence, wherein transcription of said chimeric or fused nucleic acid molecule results in a single chimeric nucleic acid transcript.

60. The chimeric or fused nucleic acid molecule of claim 59, wherein said heterologous coding sequence is from a sequence encoding a different G protein-coupled receptor.

61. The chimeric or fused nucleic acid molecule of claim 59, wherein said heterologous coding sequence is a sequence that facilitates expression of said mammalian G protein-coupled receptor polypeptide on the surface of a cell.

62. The chimeric or fused nucleic acid molecule of claim 61, wherein said heterologous coding sequence is from a mammalian rhodopsin gene.

63. The chimeric or fused nucleic acid molecule of claim 59, wherein said heterologous coding sequence is from a gene encoding green fluorescent protein or other detectable marker gene.

64. A nucleic acid molecule comprising the isolated cDNA of claim 54 operably linked to a heterologous promoter that is either regulatable or constitutive.

65. The nucleic acid molecule of claim 64, wherein said regulatable promoter is inducible under specific environmental or developmental conditions.

66. An isolated cDNA molecule comprising a nucleic acid sequence having at least about 50% sequence identity to the G protein-coupled receptor polypeptide coding region in a genomic DNA sequence consisting essentially of a nucleic acid sequence selected from the group consisting of SEQ ID NOs 15 and 20.

67. An isolated RNA molecule transcribed from the isolated DNA molecule of claim 66.

68. An isolated nucleic acid molecule that hybridizes to the DNA molecule of claim 66 under stringent hybridization conditions.

69. An isolated nucleic acid molecule that hybridizes to the DNA molecule of claim 66 under moderate hybridization conditions.

70. An isolated fragment of the genomic DNA molecule of claim 66 that is at least about 20 to 30 nucleotide bases in length.

71. A chimeric or fused nucleic acid molecule, wherein said chimeric or fused nucleic acid molecule comprises at least part of the coding sequence contained in the DNA molecule of claim 66, and at least part of a heterologous coding sequence, wherein transcription of said chimeric or fused nucleic acid molecule results in a single chimeric nucleic acid transcript.

72. The chimeric or fused nucleic acid molecule of claim 71, wherein said heterologous coding sequence is from a sequence encoding a different G protein-coupled receptor.

73. The chimeric or fused nucleic acid molecule of claim 71, wherein said heterologous coding sequence is a sequence that facilitates expression of said mammalian G protein-coupled receptor polypeptide on the surface of a cell.

74. The chimeric or fused nucleic acid molecule of claim 73, wherein said heterologous coding sequence is from a mammalian rhodopsin gene.

75. The chimeric or fused nucleic acid molecule of claim 71, wherein said heterologous coding sequence is from a gene encoding green fluorescent protein or other detectable marker gene.

76. A nucleic acid molecule comprising the isolated cDNA of claim 66 operably linked to a heterologous promoter that is either regulatable or constitutive.

77. The nucleic acid molecule of claim 76, wherein said regulatable promoter is inducible under specific environmental or developmental conditions.

78. An isolated cDNA molecule comprising a nucleic acid sequence having at least about 40% sequence identity to a sequence encoding a mammalian T1R G protein-coupled receptor polypeptide comprising an amino acid sequence selected from the group consisting of SEQ ID NOs 4, 10, 12, 14, and 17.

79. An isolated RNA molecule transcribed from the isolated DNA molecule of claim 78.

80. An isolated nucleic acid molecule that hybridizes to the DNA molecule of claim 78 under stringent hybridization conditions.

81. An isolated nucleic acid molecule that hybridizes to the DNA molecule of claim 78 under moderate hybridization conditions.

82. An isolated fragment of the genomic DNA molecule of claim 78 that is at least about 20 to 30 nucleotide bases in length.

83. A chimeric or fused nucleic acid molecule, wherein said chimeric or fused nucleic acid molecule comprises at least part of the coding sequence contained in the DNA molecule of claim 78, and at least part of a heterologous coding sequence, wherein transcription of said chimeric or fused nucleic acid molecule results in a single chimeric nucleic acid transcript.

84. The chimeric or fused nucleic acid molecule of claim 83, wherein said heterologous coding sequence is from a sequence encoding a different G protein-coupled receptor.

85. The chimeric or fused nucleic acid molecule of claim 83, wherein said heterologous coding sequence is a sequence that facilitates expression of said mammalian G protein-coupled receptor polypeptide on the surface of a cell.

86. The chimeric or fused nucleic acid molecule of claim 85, wherein said heterologous coding sequence is from a mammalian rhodopsin gene.

87. The chimeric or fused nucleic acid molecule of claim 83, wherein said heterologous coding sequence is from a gene encoding green fluorescent protein or other detectable marker gene.

88. A nucleic acid molecule comprising the isolated cDNA of claim 78 operably linked to a heterologous promoter that is either regulatable or constitutive.

89. The nucleic acid molecule of claim 88, wherein said regulatable promoter is inducible under specific environmental or developmental conditions.

90. An isolated variant DNA molecule comprising a nucleotide sequence consisting essentially of a nucleic acid sequence selected from the group consisting of SEQ ID NOs 15 and 20, containing at least one conservative substitution in a region coding for a G protein-coupled receptor active in taste signaling.

91. An isolated RNA molecule transcribed from the isolated DNA molecule of claim 90.

92. An isolated nucleic acid molecule that hybridizes to the DNA molecule of claim 90 under stringent hybridization conditions.

93. An isolated nucleic acid molecule that hybridizes to the DNA molecule of claim 90 under moderate hybridization conditions.

94. An isolated fragment of the genomic DNA molecule of claim 90 that is at least about 20 to 30 nucleotide bases in length.

95. A chimeric or fused nucleic acid molecule, wherein said chimeric or fused nucleic acid molecule comprises at least part of the coding sequence contained in the DNA molecule of claim 90, and at least part of a heterologous coding sequence, wherein transcription of said chimeric or fused nucleic acid molecule results in a single chimeric nucleic acid transcript.

96. The chimeric or fused nucleic acid molecule of claim 95, wherein said heterologous coding sequence is from a sequence encoding a different G protein-coupled receptor.

97. The chimeric or fused nucleic acid molecule of claim 95, wherein said heterologous coding sequence is a sequence that facilitates expression of said mammalian G protein-coupled receptor polypeptide on the surface of a cell.

98. The chimeric or fused nucleic acid molecule of claim 97, wherein said heterologous coding sequence is from a mammalian rhodopsin gene.

99. The chimeric or fused nucleic acid molecule of claim 95, wherein said heterologous coding sequence is from a gene encoding green fluorescent protein or other detectable marker gene.

100. A cDNA molecule having the same nucleic acid sequence as the coding region of the variant DNA molecule of claim 90.

101. A nucleic acid molecule comprising the cDNA of claim 100 operably linked to a heterologous promoter that is either regulatable or constitutive.

102. The nucleic acid molecule of claim 101, wherein said regulatable promoter is inducible under specific environmental or developmental conditions.

103. An isolated variant molecule comprising a nucleotide sequence encoding a polypeptide having an amino acid sequence selected from the group consisting of SEQ ID NOs 4, 14, 17, and 21, containing at least one conservative substitution in a coding region.

104. An isolated RNA molecule transcribed from the isolated DNA molecule of claim 103.

105. An isolated nucleic acid molecule that hybridizes to the DNA molecule of claim 103 under stringent hybridization conditions.

106. An isolated nucleic acid molecule that hybridizes to the DNA molecule of claim 103 under moderate hybridization conditions.

107. An isolated fragment of the genomic DNA molecule of claim 103 that is at least about 20 to 30 nucleotide bases in length.

108. A chimeric or fused nucleic acid molecule, wherein said chimeric or fused nucleic acid molecule comprises at least part of the coding sequence contained in the DNA molecule of claim 103, and at least part of a heterologous coding sequence, wherein transcription of said chimeric or fused nucleic acid molecule results in a single chimeric nucleic acid transcript.

109. The chimeric or fused nucleic acid molecule of claim 108, wherein said heterologous coding sequence is from a sequence encoding a different G protein-coupled receptor.

110. The chimeric or fused nucleic acid molecule of claim 108, wherein said heterologous coding sequence is a sequence that facilitates expression of said mammalian G protein-coupled receptor polypeptide on the surface of a cell.

111. The chimeric or fused nucleic acid molecule of claim 110, wherein said heterologous coding sequence is from a mammalian rhodopsin gene.

112. The chimeric or fused nucleic acid molecule of claim 108, wherein said heterologous coding sequence is from a gene encoding green fluorescent protein or other detectable marker gene.

113. A cDNA molecule having the same nucleic acid sequence as the coding region of the variant DNA molecule of claim 103.

114. A nucleic acid molecule comprising the cDNA molecule of claim 113 operably linked to a heterologous promoter that is either regulatable or constitutive.

115. The nucleic acid molecule of claim 114, wherein said regulatable promoter is inducible under specific environmental or developmental conditions.

116. The isolated nucleic acid molecule of claim 1, wherein said nucleic acid encodes a G protein-coupled receptor polypeptide that is active in taste signaling in rat, mouse, or human.

117. An expression vector comprising an isolated nucleic acid molecule of claim 1, wherein said vector is selected from the group consisting of mammalian vectors, bacterial plasmids, bacterial phagemids, mammalian viruses and retroviruses, bacteriophage vectors and linear or circular DNA molecules capable of integrating into a host cell genome.

118. A host cell transfected with at least one of the expression vectors of claim 117, wherein said host cell expresses the encoded G protein-coupled receptor polypeptides on the surface of said host cell.

119. A nucleic acid array comprising at least about 20 to 30 nucleotides of at least one of the isolated nucleic acid molecules of claim 1, wherein the at least one nucleic acid molecules are linked covalently or noncovalently to a solid phase support.

120. A method of screening for compounds that activate taste signaling comprising:

(i) contacting the host cell of claim 118 with a putative taste activating compound; and

(ii) measuring activity from said G protein-coupled receptor polypeptide expressed on the cell surface.

121. The method of claim 120, wherein said G protein-coupled receptor polypeptide activity is measured by assayed by measuring changes in intracellular Ca^{2+} levels, cAMP, cGMP and IP3, or G protein binding of GTPγS.

122. The method of claim 120, wherein said host cell is transfected with at least one additional nucleic acid construct encoding a gene involved in taste signaling.

123. The method of claim 122, wherein said at least one additional gene encodes a G protein involved in taste signal transduction.

124. The method of claim 123, wherein said G protein is a promiscuous G protein.

125. A method of screening for compounds that modulate taste signaling transduction comprising:

(i) contacting a host cell according to claim 118 with a known taste activating compound and a compound putatively involved in taste transduction modulation;

(ii) contacting a host cell according to claim 118 with a known taste activating compound alone; and

(iii) comparing the activity from said G protein-coupled receptor polypeptide expressed on the cell surface of the host cell of step (i) with the activity from said G protein-coupled receptor polypeptide expressed on the cell surface of the host cell of step (ii) to identify modulators of taste transduction.

126. The method of claim 125, wherein said modulatory compounds are selected from the group consisting of activators, inhibitors, stimulators, enhancers, agonists and antagonists.

127. The method of claim 125, wherein said G protein-coupled receptor polypeptide activity is measured by assayed by measuring changes in intracellular Ca^{2+} levels, cAMP, cGMP and IP3, or G protein binding of GTPγS.

128. The method of claim 125, wherein said host cell is transfected with at least one additional nucleic acid construct encoding a gene involved in taste signaling.

129. The method of claim 128, wherein said at least one additional gene encodes a G protein involved in taste signal transduction.

130. The method of claim 129, wherein said G protein is a promiscuous G protein.

131. A method of detecting expression of a G protein-coupled receptor polypeptide gene in a cell comprising:

(i) contacting said cell with a nucleic acid molecule that hybridizes to the isolated nucleic acid molecule of claim 1 under stringent conditions; and

(ii) detecting hybridization in order to detect expression of said G protein-coupled receptor polypeptide gene.

132. An isolated nucleic acid molecule encoding a G protein-coupled receptor polypeptide active in taste signaling having the nucleotide sequence of SEQ ID NO: 1.

133. An isolated nucleic acid molecule encoding a G protein-coupled receptor polypeptide active in taste signaling having the nucleotide sequence of SEQ ID NO: 2.

134. An isolated nucleic acid molecule encoding a G protein-coupled receptor polypeptide active in taste signaling having the nucleotide sequence of SEQ ID NO: 9.

135. An isolated nucleic acid molecule encoding a G protein-coupled receptor polypeptide active in taste signaling having the nucleotide sequence of SEQ ID NO: 11.

136. An isolated nucleic acid molecule having the nucleotide sequence of SEQ ID NO: 3.

137. An isolated nucleic acid molecule having the nucleotide sequence of SEQ ID NO: 13.

138. An isolated nucleic acid molecule having the nucleotide sequence of SEQ ID NO: 15.

139. An isolated nucleic acid molecule having the nucleotide sequence of SEQ ID NO: 16.

140. An isolated nucleic acid molecule encoding the polypeptide having the amino acid sequence of SEQ ID NO: 4.

141. An isolated nucleic acid molecule encoding the G protein-coupled receptor polypeptide active in taste signaling having the amino acid sequence of SEQ ID NO: 10.

142. An isolated nucleic acid molecule encoding the G protein-coupled receptor polypeptide active in taste signaling having the amino acid sequence of SEQ ID NO: 12.

143. An isolated nucleic acid molecule encoding the polypeptide having the amino acid sequence of SEQ ID NO: 14.

144. An isolated nucleic acid molecule encoding the polypeptide having the amino acid sequence of SEQ ID NO: 17.

145. An isolated nucleic acid molecule encoding a G protein-coupled receptor polypeptide active in taste signaling comprising the consensus sequence of SEQ ID NO: 18, or a consensus sequence having at least 75% identity to the sequence of SEQ ID NO: 18.

146. An isolated nucleic acid encoding a G protein-coupled receptor polypeptide active in taste signaling comprising the consensus sequence of SEQ

ID NO: 19, or a consensus sequence having at least 75% identity to the sequence of SEQ ID NO: 19.

147. A genomic DNA amplified by a PCR reaction with at least one degenerate primer having a nucleic acid sequence of SEQ ID NOs 5 or 6, or consisting essentially of a nucleic acid sequence encoding a consensus sequence of SEQ ID NO 18 or 19, wherein said amplified DNA comprises a coding sequence for a G protein-coupled receptor polypeptide active in taste signaling.

148. A method for isolating a genomic sequence comprising a coding sequence for a G protein-coupled receptor polypeptide active in taste signaling, said method comprising contacting a mammalian genome with at least one degenerate primer having a nucleic acid sequence of SEQ ID NOs 5 or 6, or consisting essentially of a nucleic acid sequence encoding a consensus sequence of SEQ ID NO 18 or 19, and amplifying said genomic sequence comprising said primer sequence in the presence of polymerase, free nucleotides and cofactors.

149. A method for screening a mammalian genome for a coding sequence for a G protein-coupled receptor active in taste signaling, comprising:

(i) contacting said mammalian genome with at least one degenerate primer having a nucleic acid sequence of SEQ ID NOs 5 or 6, or consisting essentially of a nucleic acid sequence encoding a consensus sequence of SEQ ID NO 18 or 19;

(ii) amplifying said genomic sequence comprising said at least one primer sequence in the presence of polymerase, free nucleotides and cofactors; and

(iii) detecting the presence of an amplified sequence comprising a G protein-coupled receptor polypeptide gene.

150. Plasmid SAV115 comprising a mouse T1R3 gene.

151. Plasmid SAV118 comprising a rat T1R3 gene.

152. An isolated polypeptide selected from the group consisting of:

(i) a G protein-coupled receptor polypeptide active in taste signaling encoded by a nucleic acid molecule comprising a nucleic acid sequence selected from the group consisting of SEQ ID NOs 9 and 11, and genomic sequences consisting essentially of SEQ ID NOs 1, and 2;

(ii) a G protein-coupled receptor polypeptide encoded by a nucleic acid molecule comprising a nucleic acid sequence selected from the group consisting of SEQ ID NOs 3, 13, 16, and 20, and a genomic sequence consisting essentially of a nucleic acid sequence selected from the group consisting of SEQ ID NOs 15 and 20;

(iii) a G protein-coupled receptor polypeptide active in taste signaling comprising an amino acid sequence selected from the group consisting of SEQ ID NOs 10 and 12;

(iv) a G protein-coupled receptor polypeptide comprising an amino acid sequence selected from the group consisting of SEQ ID NOs 4, 14, 17, and 21;

(v) a G protein-coupled receptor polypeptide active in taste signaling encoded by a nucleic acid molecule comprising a nucleic acid sequence having at least about 50% identify to a nucleic acid sequence selected from the group consisting of SEQ ID NOs 9 and 11, and genomic sequences consisting essentially of SEQ ID NOs 1, and 2;

(vi) a G protein-coupled receptor polypeptide encoded by a nucleic acid molecule comprising a nucleic acid sequence having at least about 50% identify to a nucleic acid sequence selected from the group consisting of SEQ ID NOs 3, 13, 16, and 20, and a genomic sequence consisting essentially of a nucleic acid sequence selected from the group consisting of SEQ ID NOs 15 and 20;

(vii) a G protein-coupled receptor polypeptide active in taste signaling comprising an amino acid sequence that is at least about 40% identical to an amino acid sequence selected from the group consisting of SEQ ID NOs 10 and 12;

(viii) a G protein-coupled receptor polypeptide comprising an amino acid sequence that is at least about 40% identical to an amino acid sequence selected from the group consisting of SEQ ID NOs 4, 14, 17, and 21;

(ix) a variant of a G protein-coupled receptor polypeptide active in taste signaling encoded by a nucleic acid molecule comprising a nucleic acid sequence selected from the group consisting of SEQ ID NOs 9 and 11, and genomic sequences consisting essentially of SEQ ID NOs 1, and 2, wherein said variant protein contains at least one conservative substitution relative to the G protein-coupled receptor encoded by said nucleotide sequence;

(x) a variant a G protein-coupled receptor polypeptide encoded by a nucleic acid molecule comprising a nucleic acid sequence selected from the group consisting of SEQ ID NOs 3, 13, 16, and 20, and a genomic sequence consisting essentially of a nucleic acid sequence selected from the group consisting of SEQ ID NOs 15 and 20, wherein said variant protein contains at least one conservative substitution relative to the G protein-coupled receptor encoded by said nucleotide sequence;

(xi) a variant of a G protein-coupled receptor polypeptide active in taste signaling comprising an amino acid sequence selected from the group consisting of SEQ ID NOs 10 and 12, containing at least one conservative substitution; and

(xii) a variant of a G protein-coupled receptor polypeptide comprising an amino acid sequence selected from the group consisting of SEQ ID NOs 4, 14, 17, and 21, containing at least one conservative substitution.

153. A fragment of the polypeptide of claim 152, wherein said fragment comprises at least about 5 to 7 amino acids.

154. The fragment of claim 153, wherein said fragment contains an extracellular domain of a T1R mammalian G protein-coupled receptor polypeptide.

155. The fragment of claim 154, wherein said extracellular domain interacts with a compound involved in taste activation or modulation.

156. The fragment of claim 154, wherein said extracellular domain interacts with a protein involved in taste signal transduction.

157. The fragment of claim 156, wherein said protein involved in taste signal transduction is a G protein subunit.

158. The fragment of claim 157, wherein said G protein subunit is a promiscuous G protein.

159. A chimeric or fusion polypeptide comprising at least part of the amino acid sequence of a polypeptide of claim 152, and at least part of a heterologous amino acid sequence.

160. The chimeric or fusion polypeptide of claim 159, wherein said heterologous sequence is a sequence from a different G protein-coupled receptor.

161. The chimeric or fusion polypeptide of claim 159, wherein said heterologous sequence is a sequence from green fluorescent protein.

162. A method of screening one or more compounds for the presence of a compound that activates or modulates taste signaling, comprising contacting said one or more compounds with one or more fragments of one or more polypeptides according to claim 152, wherein the one or more fragments are at least about a 5 to 7 amino acids in length.

163. A method for screening one or more proteins for the presence of a protein that interacts with a G protein-coupled receptor active in taste signaling, comprising contacting said one or more proteins with one or more fragments of one or more polypeptides according to claim 152, wherein the one or more fragments are at least about a 5 to 7 amino acids in length.

164. A polypeptide array comprising at least about a 5 to 7 amino acid segment of one or more polypeptides according to claim 152, wherein said one or more polypeptide segments are linked covalently or noncovalently to a solid phase support.

165. An isolated antibody or antibody fragment that binds with specificity to a polypeptide of claim 152.

166. An isolated polypeptide having the amino acid sequence of SEQ ID NO: 4.

167. An isolated polypeptide having the amino acid sequence of SEQ ID NO: 10.

168. An isolated polypeptide having the amino acid sequence of SEQ ID NO: 12.

169. An isolated polypeptide having the amino acid sequence of SEQ ID NO: 14.

170. An isolated polypeptide having the amino acid sequence of SEQ ID NO: 17.

171. A method for representing the perception of one or more tastes in one or more mammals, comprising the steps of:

(i) providing values X_1 to X_n representative of the quantitative stimulation of each of n taste receptors of said mammals; and

(ii) generating from said values a quantitative representation of taste perception, wherein at least one of said taste receptors is a taste receptor polypeptide having a sequence that is at least about 40% identical to a sequence selected from the group consisting of SEQ ID NOs 4, 10, 12, 14, and 17.

172. The method of claim 171, wherein said representation constitutes a point or a volume in n-dimensional space.

173. The method of claim 171, wherein said representation constitutes a graph or a spectrum.

174. The method of claim 171, wherein said representation constitutes a matrix of quantitative representations.

175. The method of claim 171, wherein said providing step comprises contacting a plurality of recombinantly produced taste receptors with a test composition and quantitatively measuring the interaction of said composition with said receptors.

176. A method for predicting the taste perception in a mammal generated by one or more molecules or combinations of molecules comprising the steps of:

(i) providing values X_1 to X_n representative of the quantitative stimulation of each of n taste receptors of said mammal, for one or more molecules or combinations of molecules yielding known taste perception in a mammal,

(ii) generating from said values a quantitative representation of taste perception in a mammal for the one or more molecules or combinations of molecules yielding known taste perception in a mammal;

(iii) providing values X_1 to X_n representative of the quantitative stimulation of each of n taste receptors of said mammal, for one or more molecules or combinations of molecules yielding unknown taste perception in a mammal,

(iv) generating from said values a quantitative representation of taste perception in a mammal for the one or more molecules or combinations of molecules yielding unknown taste perception in a mammal; and

(v) predicting the taste perception in a mammal generated by one or more molecules or combinations of molecules yielding unknown taste perception in a mammal by comparing the quantitative representation of taste perception in a mammal generated by one or more molecules or combinations of molecules yielding unknown taste perception in a mammal to the quantitative representation of taste perception in a mammal for the one or more molecules or combinations of molecules yielding known taste perception in a mammal,

wherein at least one of said taste receptors is a taste receptor polypeptide having a sequence that is at least about 40% identical to a sequence selected from the group consisting of SEQ ID NOs 4, 10, 12, 14, and 17.

177. A genomic DNA molecule consisting essentially of a nucleic acid sequence coding for a mammalian G protein-coupled receptor polypeptide active in taste signaling comprising a consensus sequence selected from the group consisting of SEQ ID NOs 18 and 19, and sequences having at least about 75% identity to SEQ ID NOs 18 or 19.

178. An isolated RNA molecule transcribed from the isolated DNA molecule of claim 177.

179. An isolated nucleic acid molecule that hybridizes to the DNA molecule of claim 177 under stringent hybridization conditions.

180. An isolated nucleic acid molecule that hybridizes to the DNA molecule of claim 177 under moderate hybridization conditions.

181. An isolated fragment of the genomic DNA molecule of claim 177 that is at least about 20 to 30 nucleotide bases in length.

182. A chimeric or fused nucleic acid molecule, wherein said chimeric or fused nucleic acid molecule comprises at least part of the coding sequence contained in the DNA molecule of claim 177, and at least part of a heterologous coding sequence, wherein transcription of said chimeric or fused nucleic acid molecule results in a single chimeric nucleic acid transcript.

183. The chimeric or fused nucleic acid molecule of claim 182, wherein said heterologous coding sequence is from a sequence encoding a different G protein-coupled receptor.

184. The chimeric or fused nucleic acid molecule of claim 182, wherein said heterologous coding sequence is a sequence that facilitates expression of said mammalian G protein-coupled receptor polypeptide on the surface of a cell.

185. The chimeric or fused nucleic acid molecule of claim 184, wherein said heterologous coding sequence is from a mammalian rhodopsin gene.

186. The chimeric or fused nucleic acid molecule of claim 182, wherein said heterologous coding sequence is from a gene encoding green fluorescent protein or other detectable marker gene.

187. A cDNA sequence coding for a mammalian G protein-coupled receptor polypeptide active in taste signaling comprising a consensus sequence selected from the group consisting of SEQ ID NOs 18 and 19, and sequences having at least about 75% identity to SEQ ID NOs 18 or 19.

188. An isolated RNA molecule transcribed from the isolated DNA molecule of claim 187.

189. An isolated nucleic acid molecule that hybridizes to the DNA molecule of claim 187 under stringent hybridization conditions.

190. An isolated nucleic acid molecule that hybridizes to the DNA molecule of claim 187 under moderate hybridization conditions.

191. An isolated fragment of the genomic DNA molecule of claim 187 that is at least about 20 to 30 nucleotide bases in length.

192. A chimeric or fused nucleic acid molecule, wherein said chimeric or fused nucleic acid molecule comprises at least part of the coding sequence contained in the DNA molecule of claim 187, and at least part of a heterologous coding sequence, wherein transcription of said chimeric or fused nucleic acid molecule results in a single chimeric nucleic acid transcript.

193. The chimeric or fused nucleic acid molecule of claim 192, wherein said heterologous coding sequence is from a sequence encoding a different G protein-coupled receptor.

194. The chimeric or fused nucleic acid molecule of claim 192, wherein said heterologous coding sequence is a sequence that facilitates expression of said mammalian G protein-coupled receptor polypeptide on the surface of a cell.

195. The chimeric or fused nucleic acid molecule of claim 194, wherein said heterologous coding sequence is from a mammalian rhodopsin gene.

196. The chimeric or fused nucleic acid molecule of claim 192, wherein said heterologous coding sequence is from a gene encoding green fluorescent protein or other detectable marker gene.

197. A nucleic acid molecule comprising the isolated cDNA of claim 187 operably linked to a heterologous promoter that is either regulatable or constitutive.

198. The nucleic acid molecule of claim 197, wherein said regulatable promoter is inducible under specific environmental or developmental conditions.

199. A cDNA molecule comprising a nucleic acid sequence selected from the group consisting of SEQ ID NOs 3, 13, 16, and 20.

200. An isolated RNA molecule transcribed from the isolated DNA molecule of claim 199.

201. An isolated nucleic acid molecule that hybridizes to the DNA molecule of claim 199 under stringent hybridization conditions.

202. An isolated nucleic acid molecule that hybridizes to the DNA molecule of claim 199 under moderate hybridization conditions.

203. An isolated fragment of the genomic DNA molecule of claim 199 that is at least about 20 to 30 nucleotide bases in length.

204. A chimeric or fused nucleic acid molecule, wherein said chimeric or fused nucleic acid molecule comprises at least part of the coding sequence contained in the DNA molecule of claim 199, and at least part of a heterologous coding sequence, wherein transcription of said chimeric or fused nucleic acid molecule results in a single chimeric nucleic acid transcript.

205. The chimeric or fused nucleic acid molecule of claim 204, wherein said heterologous coding sequence is from a sequence encoding a different G protein-coupled receptor.

206. The chimeric or fused nucleic acid molecule of claim 204, wherein said heterologous coding sequence is a sequence that facilitates expression of said mammalian G protein-coupled receptor polypeptide on the surface of a cell.

207. The chimeric or fused nucleic acid molecule of claim 206, wherein said heterologous coding sequence is from a mammalian rhodopsin gene.

208. The chimeric or fused nucleic acid molecule of claim 204, wherein said heterologous coding sequence is from a gene encoding green fluorescent protein or other detectable marker gene.

209. A nucleic acid molecule comprising the isolated cDNA of claim 199 operably linked to a heterologous promoter that is either regulatable or constitutive.

210. The nucleic acid molecule of claim 209, wherein said regulatable promoter is inducible under specific environmental or developmental conditions.

211. A cDNA molecule comprising a nucleic acid sequence having at least about 50% identity to a sequence selected from the group consisting of SEQ ID NOs 3, 13, 16, and 20.

212. An isolated RNA molecule transcribed from the isolated DNA molecule of claim 211.

213. An isolated nucleic acid molecule that hybridizes to the DNA molecule of claim 211 under stringent hybridization conditions.

214. An isolated nucleic acid molecule that hybridizes to the DNA molecule of claim 211 under moderate hybridization conditions.

215. An isolated fragment of the genomic DNA molecule of claim 211 that is at least about 20 to 30 nucleotide bases in length.

216. A chimeric or fused nucleic acid molecule, wherein said chimeric or fused nucleic acid molecule comprises at least part of the coding sequence contained in the DNA molecule of claim 211, and at least part of a heterologous coding sequence, wherein transcription of said chimeric or fused nucleic acid molecule results in a single chimeric nucleic acid transcript.

217. The chimeric or fused nucleic acid molecule of claim 216, wherein said heterologous coding sequence is from a sequence encoding a different G protein-coupled receptor.

218. The chimeric or fused nucleic acid molecule of claim 216, wherein said heterologous coding sequence is a sequence that facilitates expression of said mammalian G protein-coupled receptor polypeptide on the surface of a cell.

219. The chimeric or fused nucleic acid molecule of claim 218, wherein said heterologous coding sequence is from a mammalian rhodopsin gene.

220. The chimeric or fused nucleic acid molecule of claim 216, wherein said heterologous coding sequence is from a gene encoding green fluorescent protein or other detectable marker gene.

221. A nucleic acid molecule comprising the isolated cDNA of claim 211 operably linked to a heterologous promoter that is either regulatable or constitutive.

222. The nucleic acid molecule of claim 221, wherein said regulatable promoter is inducible under specific environmental or developmental conditions.

223. The fragment of claim 153, wherein said fragment includes at least an N-terminal fragment of a G protein-coupled receptor.

224. The fragment of claim 223, wherein said N-terminal fragment is involved in ligand binding.

225. The polypeptide fragment of claim 224, wherein said fragment is at least about 100 amino acids in length.

226. The polypeptide fragment of claim 224, wherein said fragment is at least about 600 amino acids in length.

227. A biochemical assay for identifying taste stimulus ligands having binding specificity for a G protein-coupled receptor active in taste signaling, comprising:

(i) contacting one or more fragments according to claim 224 with one or more putative taste stimulus ligands or a composition comprising one or more putative taste stimulus ligands; and

(ii) detecting binding of a taste stimulus ligand having binding specificity for said G protein-coupled receptor active in taste signaling.

228. The assay of claim 227, wherein binding is detected by displacement of a radiolabeled known binding ligand.

229. The assay of claim 228, wherein said known binding ligand is an antibody or antibody fragment having binding specificity to said G protein-coupled receptor.

230. An isolated nucleic acid molecule having the nucleic acid sequence of SEQ ID NO 20.

231. A chimeric or fusion polypeptide comprising at least an extracellular domain of at least one polypeptide according to claim 152, and at least part of a heterologous amino acid sequence.

232. The chimeric or fusion polypeptide of claim 231, wherein said heterologous amino acid sequence is a sequence from a different G protein-coupled receptor.

233. The chimeric or fusion polypeptide of claim 232, wherein said different G protein-coupled receptor is a T1R mammalian G protein-coupled receptor, and said heterologous amino acid sequence includes at least an extracellular domain of said T1R mammalian G protein-coupled receptor.

234. A biochemical assay for identifying taste stimulus ligands having binding specificity for a G protein-coupled receptor active in taste signaling, comprising:

(i) contacting one or more fragments according to claim 224 with a preparation of G proteins and GTPγS, and one or more putative taste stimulus ligands or a composition comprising one or more putative taste stimulus ligands; and

(ii) detecting binding of a taste stimulus ligand having binding specificity for said G protein-coupled receptor active in taste signaling by measuring the binding of GTPγS to the G protein.